

Candidate Name	Centre Number	Candidate Number
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GCSE

245/01

**SCIENCE CHEMISTRY
FOUNDATION TIER
CHEMISTRY 3**

A.M. THURSDAY, 5 June 2008

45 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	5	
2.	3	
3.	3	
4.	5	
5.	4	
6.	4	
7.	6	
8.	5	
9.	5	
10.	6	
11.	4	
Total	50	

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

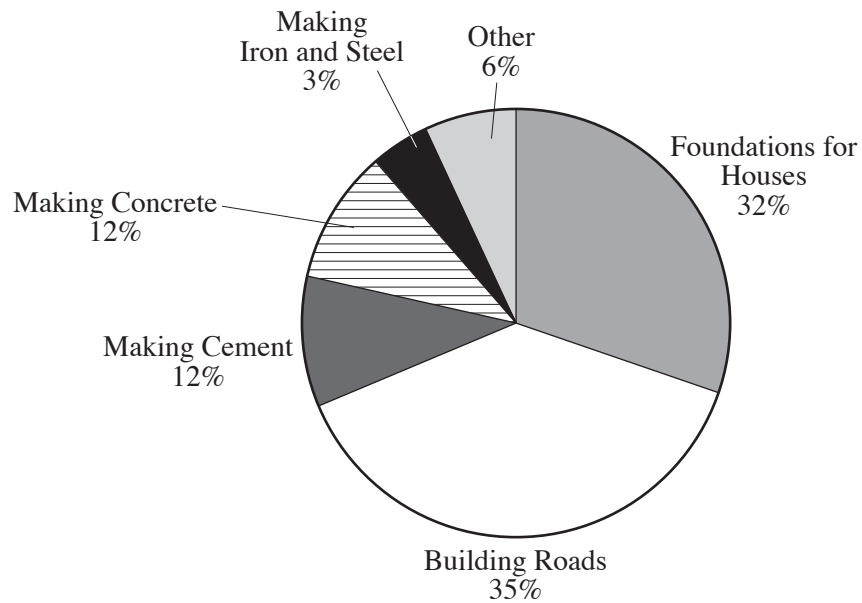
The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The Periodic Table is printed on the back cover of the examination paper and the formulae for some common ions on the inside of the back cover.

Answer **all** questions.

1. (a) The pie chart below shows some of the major uses of limestone.



Uses of Limestone in the Construction Industry

Use the pie chart to answer parts I and II.

- I. Give the percentage of limestone used to make iron and steel

.....%

[1]

- II. Name the section of the construction industry which uses the **most** limestone.

.....

[1]

(b) The box below contains some statements about the effects of limestone quarrying.

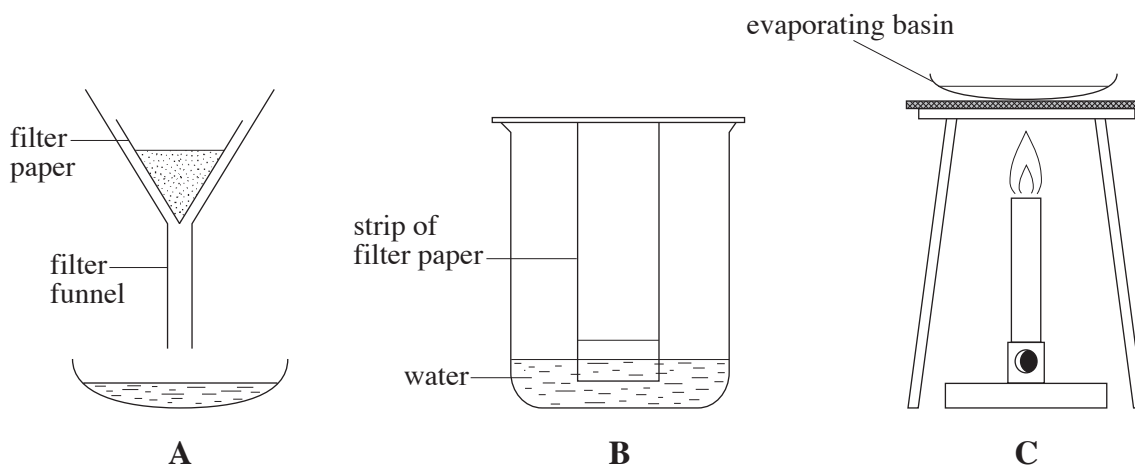
dust from lorries and blasting **creates more wealth for the community**
more jobs locally **noise from blasting** **spoils the landscape**
provides materials for the building industry

Put each statement in the correct column below.

[3]

<i>Advantages of limestone quarrying</i>	<i>Disadvantages of limestone quarrying</i>

2. The diagrams below show three methods, **A**, **B** and **C**, used to separate mixtures.



Give the letter, **A**, **B** or **C**, of the method you would use to

- (i) show that sea-water contains salt, [1]
- (ii) remove sand from sea-water, [1]
- (iii) show that an orange felt-tipped pen contains red and yellow dyes. [1]

3. Flame tests can be used to identify the presence of some metals in metal compounds.

green lilac yellow-orange red

- (i) Choose colours **from the box above** to complete the table below. [2]

<i>Metal compound</i>	<i>Flame colour</i>
calcium chloride	
potassium chloride	
sodium chloride	

- (ii) Describe how you would carry out a flame test. [1]

.....

.....

4. Read the information in the box below.

Some scientists believe that drinking small amounts of alcohol reduces the risk of heart disease. It also helps people feel more confident and helps them relax. However, excessive drinking increases the risk of liver damage, heart disease, stomach disorders and depression. Excessive drinking also makes some people aggressive and it can result in road accidents. The government collects money by taxing the sale of alcohol.

Use only the information in the box above to answer this question.

(i) Apart from heart disease, name **two** health problems caused by the excessive use of alcohol.
..... and [1]

(ii) Give **two** anti-social behaviours caused by the excessive use of alcohol.
..... and [1]

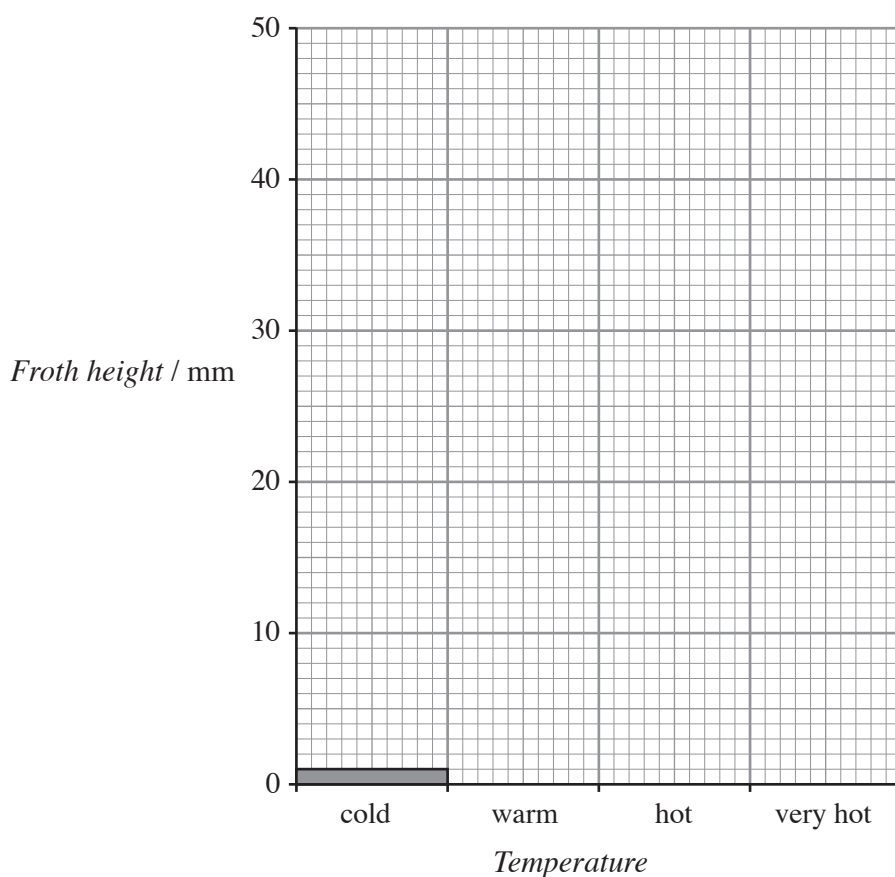
(iii) State how the government benefits from the sale of alcohol.
..... [1]

(iv) State **two** different effects that the drinking of alcohol is believed to have on the risk of heart disease.
1. [1]
2. [1]

5. Fermentation occurs when yeast is added to sugar solution. 1g of yeast granules was added to equal volumes and concentrations of sugar solution at four different temperatures. Each experiment was left to stand for 15 minutes. After 15 minutes the height of the froth formed was measured. The results obtained are shown below.

<i>Temperature</i>	cold	warm	hot	very hot
<i>Froth height / mm</i>	1	45	20	3

- (i) Complete the bar chart of the results on the grid below. One has been done for you. [2]



- (ii) The froth formed during fermentation is caused by a colourless gas being formed. This colourless gas turns limewater milky.

ammonia	carbon dioxide	chlorine	hydrogen	oxygen
---------	----------------	----------	----------	--------

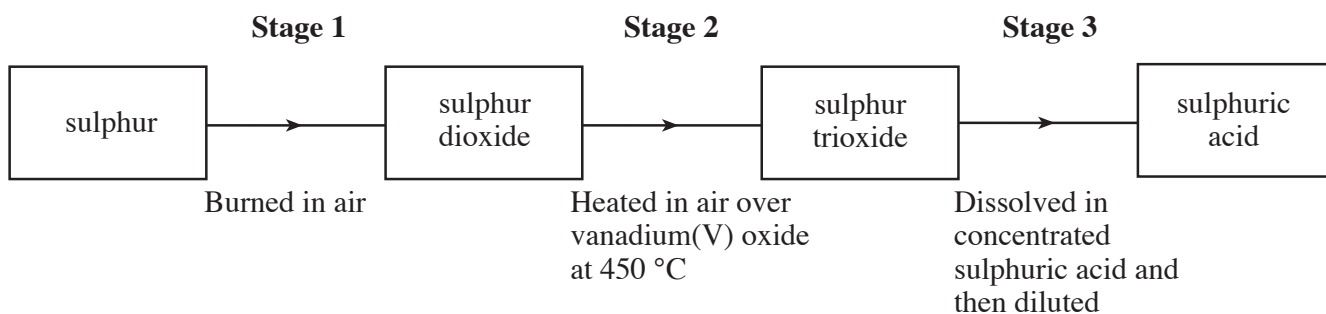
Choose from the box above the name of the gas formed during the fermentation of sugar.

..... [1]

- (iii) State **one** way the investigation was made a fair test. [1]

.....

6. The flow diagram below shows the manufacture of sulphuric acid.



(i) Write a **word** equation for **stage 1**.

..... + \longrightarrow [2]

(ii) Vanadium(V) oxide is used in **stage 2** to speed up the reaction.
Give the term used for a substance which speeds up a reaction.

[1]

.....

(iii) Name the raw material used in **stage 3** to dilute the sulphuric acid.

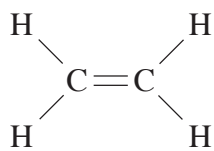
[1]

.....

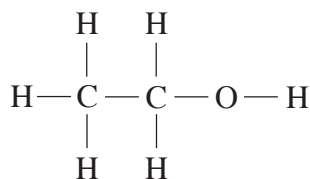
7. (i) The table below shows the names, molecular formulae and structural formulae of some alkanes. The molecular formula for propane is missing. Complete the table by putting in the missing molecular formula for propane. [1]

Name	Molecular formula	Structural formula
Methane	CH_4	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{H} \end{array}$
Ethane	C_2H_6	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$
Propane	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$
Butane	C_4H_{10}	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$

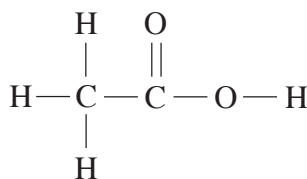
(ii) Use the four structural formulae drawn below to answer parts I, II and III.



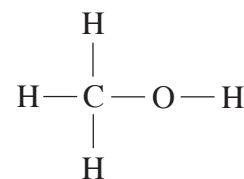
A



B



C



D

Give the letter, **A**, **B**, **C** or **D**, of the structure which shows

I. ethene, C_2H_4 ,

.....

[1]

II. ethanoic acid, CH_3COOH ,

.....

[1]

III. ethanol, $\text{C}_2\text{H}_5\text{OH}$.

.....

[1]

(iii)

wine	vinegar	car battery acid	orange juice	petrol
------	---------	------------------	--------------	--------

Choose, from the substances in the box above, the substance which contains

I. ethanol,

.....

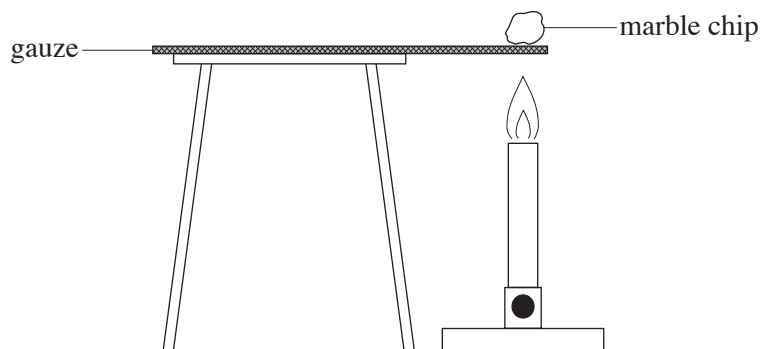
[1]

II. ethanoic acid.

.....

[1]

8. Limestone and marble are both forms of calcium carbonate, CaCO_3 . The diagram below shows the apparatus used to heat a marble chip.



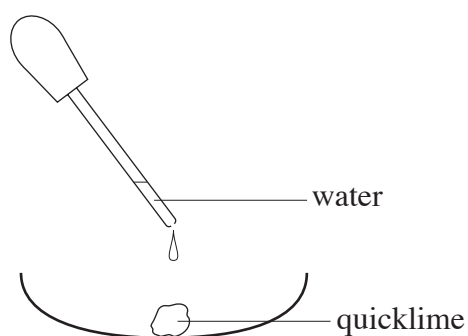
- (i) On heating, marble (calcium carbonate) forms quicklime (calcium oxide) and carbon dioxide.

Write a balanced **symbol** equation for this reaction.

[3]

..... \longrightarrow +

- (ii) If a few drops of water are dropped onto the cooled quicklime, a violent reaction takes place.



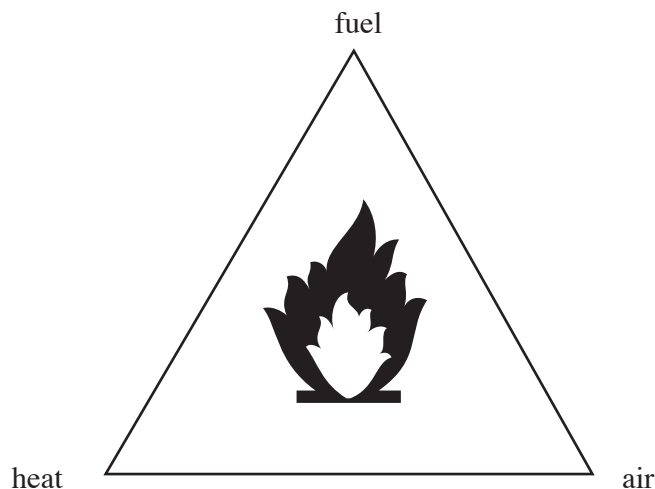
Give **two** observations you would see during this reaction.

[2]

1.

2.

9. The fire-triangle shows the factors necessary to start and maintain a fire.



(i) Give the name of the gas present in air which is necessary for burning. [1]

.....

(ii) Give a **different** fire-fighting method for each of the following situations and use the fire-triangle above to give a reason for your choice of method.

I. A garden bonfire which gets out of control. [1]

Method

Reason

II. A beaker of burning ethanol. [1]

Method

Reason

III. A science technician with her clothes on fire. [1]

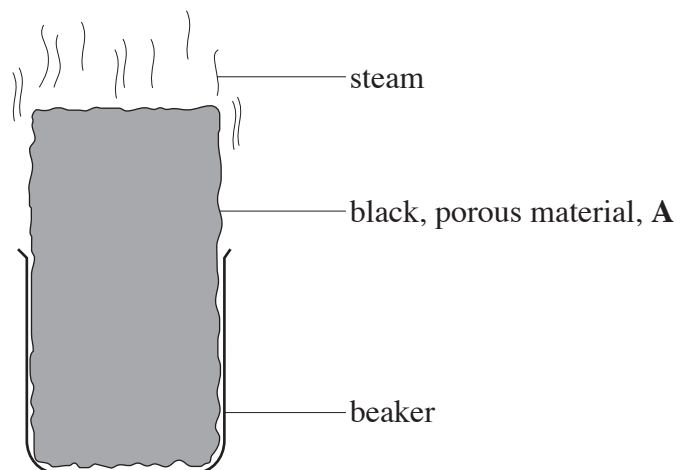
Method

Reason

(iii) Describe **one** type of fire on which water must **not** be used. [1]

.....

10. The diagram below shows the products formed when concentrated sulphuric acid is added to glucose, $C_6H_{12}O_6$. During the reaction, a black, porous material, **A**, rises up the beaker and steam is formed.



- (i) Give the
- I. chemical **symbol** for the black, porous material, **A**, [1]
 - II. chemical **formula** for steam. [1]
- (ii) State the property that concentrated sulphuric acid is demonstrating in this reaction. [1]
-
- (iii) The beaker gets very hot during the reaction. Give the term used for a reaction which produces heat. [1]
-

(iv)



A



B



C



D

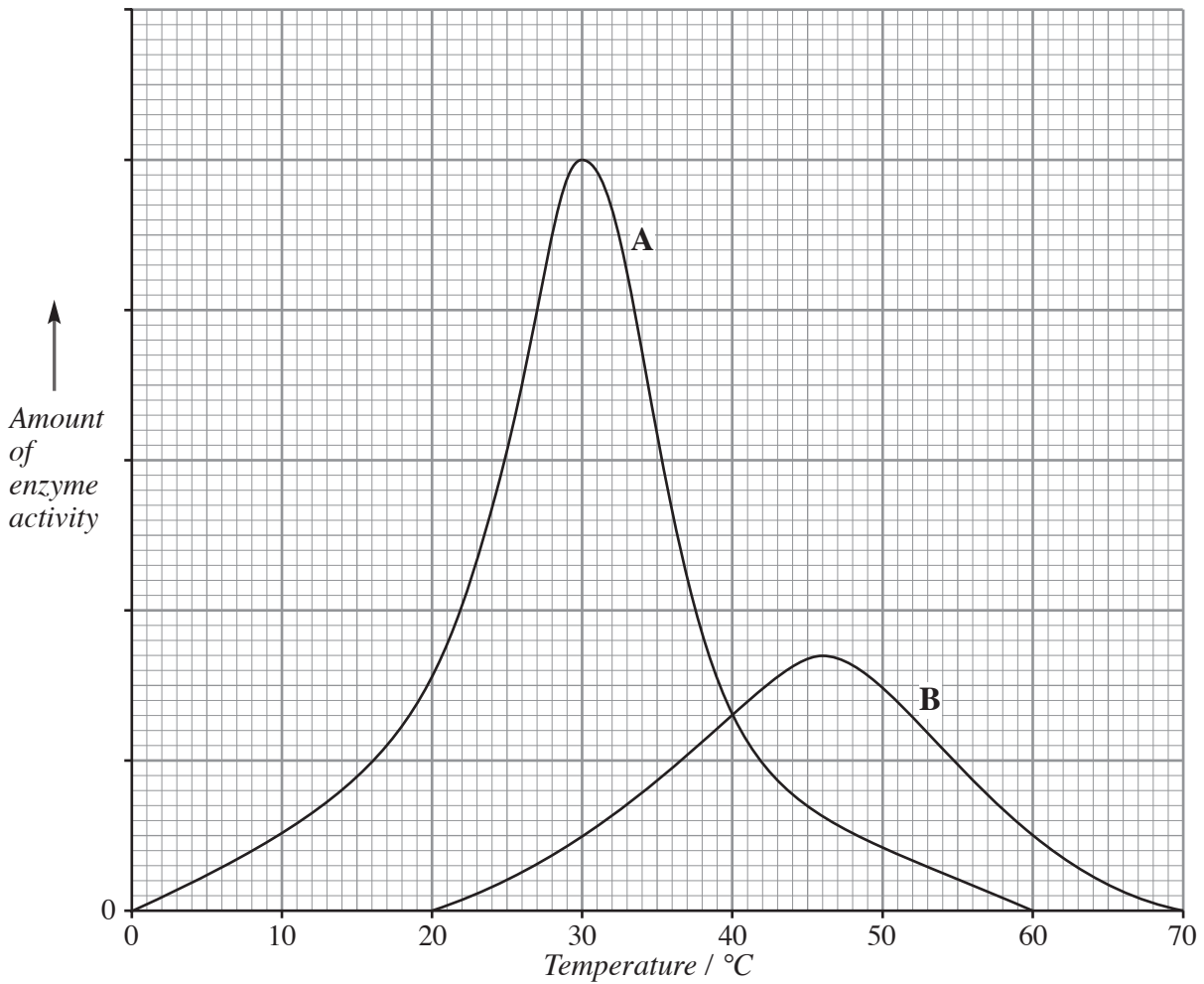
- I. Which of the hazard symbols above would you expect to see on a bottle of concentrated sulphuric acid in a laboratory? [1]

.....

- II. State **one** safety precaution taken by teachers when they handle concentrated sulphuric acid. [1]

.....

11. Enzymes are catalysts produced by living things. The graph below shows the amount of activity of two different enzymes, **A** and **B**, over a range of temperatures.



Use the graph to

- (i) give the temperature at which the amount of enzyme activity is greatest for enzyme **A**, [1]
 °C
- (ii) give the temperature at which the amount of enzyme activity is the **same** for both enzymes, [1]
 °C
- (iii) give the range of temperature over which **both** enzymes would be active, [1]
 °C to °C
- (iv) compare the amounts of the enzyme activity of enzyme **B** at 30 °C and 60 °C. [1]

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FORMULAE FOR SOME COMMON IONS

POSITIVE IONS		NEGATIVE IONS	
Name	Formula	Name	Formula
Aluminium	Al^{3+}	Bromide	Br^-
Ammonium	NH_4^+	Carbonate	CO_3^{2-}
Barium	Ba^{2+}	Chloride	Cl^-
Calcium	Ca^{2+}	Fluoride	F^-
Copper(II)	Cu^{2+}	Hydroxide	OH^-
Hydrogen	H^+	Iodide	I^-
Iron(II)	Fe^{2+}	Nitrate	NO_3^-
Iron(III)	Fe^{3+}	Oxide	O^{2-}
Lithium	Li^+	Sulphate	SO_4^{2-}
Magnesium	Mg^{2+}		
Nickel	Ni^{2+}		
Potassium	K^+		
Silver	Ag^+		
Sodium	Na^+		

PERIODIC TABLE OF ELEMENTS

1 2**Group****3****4****5****6****7****0**

$\begin{matrix} 7 \\ 3 \\ \text{Li} \\ \text{Lithium} \end{matrix}$	$\begin{matrix} 9 \\ 4 \\ \text{Be} \\ \text{Beryllium} \end{matrix}$	$\begin{matrix} 1 \\ 1 \\ \text{H} \\ \text{Hydrogen} \end{matrix}$	$\begin{matrix} 11 \\ 5 \\ \text{B} \\ \text{Boron} \end{matrix}$	$\begin{matrix} 12 \\ 6 \\ \text{C} \\ \text{Carbon} \end{matrix}$	$\begin{matrix} 14 \\ 7 \\ \text{N} \\ \text{Nitrogen} \end{matrix}$	$\begin{matrix} 16 \\ 8 \\ \text{O} \\ \text{Oxygen} \end{matrix}$	$\begin{matrix} 19 \\ 9 \\ \text{F} \\ \text{Fluorine} \end{matrix}$	$\begin{matrix} 20 \\ 10 \\ \text{Ne} \\ \text{Neon} \end{matrix}$										
$\begin{matrix} 23 \\ 11 \\ \text{Na} \\ \text{Sodium} \end{matrix}$	$\begin{matrix} 24 \\ 12 \\ \text{Mg} \\ \text{Magnesium} \end{matrix}$	$\begin{matrix} 27 \\ 13 \\ \text{Al} \\ \text{Aluminium} \end{matrix}$	$\begin{matrix} 28 \\ 14 \\ \text{Si} \\ \text{Silicon} \end{matrix}$	$\begin{matrix} 28 \\ 14 \\ \text{Si} \\ \text{Silicon} \end{matrix}$	$\begin{matrix} 31 \\ 15 \\ \text{P} \\ \text{Phosphorus} \end{matrix}$	$\begin{matrix} 32 \\ 16 \\ \text{S} \\ \text{Sulphur} \end{matrix}$	$\begin{matrix} 35 \\ 17 \\ \text{Cl} \\ \text{Chlorine} \end{matrix}$	$\begin{matrix} 40 \\ 18 \\ \text{Ar} \\ \text{Argon} \end{matrix}$										
$\begin{matrix} 39 \\ 19 \\ \text{K} \\ \text{Potassium} \end{matrix}$	$\begin{matrix} 40 \\ 20 \\ \text{Ca} \\ \text{Calcium} \end{matrix}$	$\begin{matrix} 45 \\ 21 \\ \text{Sc} \\ \text{Scandium} \end{matrix}$	$\begin{matrix} 48 \\ 22 \\ \text{Ti} \\ \text{Titanium} \end{matrix}$	$\begin{matrix} 51 \\ 23 \\ \text{V} \\ \text{Vanadium} \end{matrix}$	$\begin{matrix} 52 \\ 24 \\ \text{Cr} \\ \text{Chromium} \end{matrix}$	$\begin{matrix} 55 \\ 25 \\ \text{Mn} \\ \text{Manganese} \end{matrix}$	$\begin{matrix} 56 \\ 26 \\ \text{Fe} \\ \text{Iron} \end{matrix}$	$\begin{matrix} 59 \\ 27 \\ \text{Co} \\ \text{Cobalt} \end{matrix}$	$\begin{matrix} 59 \\ 27 \\ \text{Co} \\ \text{Cobalt} \end{matrix}$	$\begin{matrix} 64 \\ 29 \\ \text{Cu} \\ \text{Copper} \end{matrix}$	$\begin{matrix} 65 \\ 30 \\ \text{Zn} \\ \text{Zinc} \end{matrix}$	$\begin{matrix} 70 \\ 31 \\ \text{Ga} \\ \text{Gallium} \end{matrix}$	$\begin{matrix} 73 \\ 32 \\ \text{Ge} \\ \text{Germanium} \end{matrix}$	$\begin{matrix} 75 \\ 33 \\ \text{As} \\ \text{Arsenic} \end{matrix}$	$\begin{matrix} 79 \\ 34 \\ \text{Se} \\ \text{Selenium} \end{matrix}$	$\begin{matrix} 80 \\ 35 \\ \text{Br} \\ \text{Bromine} \end{matrix}$	$\begin{matrix} 84 \\ 36 \\ \text{Kr} \\ \text{Krypton} \end{matrix}$	
$\begin{matrix} 86 \\ 37 \\ \text{Rb} \\ \text{Rubidium} \end{matrix}$	$\begin{matrix} 88 \\ 38 \\ \text{Sr} \\ \text{Strontium} \end{matrix}$	$\begin{matrix} 89 \\ 39 \\ \text{Y} \\ \text{Yttrium} \end{matrix}$	$\begin{matrix} 91 \\ 40 \\ \text{Zr} \\ \text{Zirconium} \end{matrix}$	$\begin{matrix} 93 \\ 41 \\ \text{Nb} \\ \text{Niobium} \end{matrix}$	$\begin{matrix} 96 \\ 42 \\ \text{Mo} \\ \text{Molybdenum} \end{matrix}$	$\begin{matrix} 99 \\ 43 \\ \text{Tc} \\ \text{Technetium} \end{matrix}$	$\begin{matrix} 101 \\ 44 \\ \text{Ru} \\ \text{Ruthenium} \end{matrix}$	$\begin{matrix} 103 \\ 45 \\ \text{Rh} \\ \text{Rhodium} \end{matrix}$	$\begin{matrix} 106 \\ 46 \\ \text{Pd} \\ \text{Palladium} \end{matrix}$	$\begin{matrix} 108 \\ 47 \\ \text{Ag} \\ \text{Silver} \end{matrix}$	$\begin{matrix} 112 \\ 48 \\ \text{Cd} \\ \text{Cadmium} \end{matrix}$	$\begin{matrix} 115 \\ 49 \\ \text{In} \\ \text{Indium} \end{matrix}$	$\begin{matrix} 119 \\ 50 \\ \text{Sn} \\ \text{Tin} \end{matrix}$	$\begin{matrix} 122 \\ 51 \\ \text{Sb} \\ \text{Antimony} \end{matrix}$	$\begin{matrix} 128 \\ 52 \\ \text{Te} \\ \text{Tellurium} \end{matrix}$	$\begin{matrix} 127 \\ 53 \\ \text{I} \\ \text{Iodine} \end{matrix}$	$\begin{matrix} 131 \\ 54 \\ \text{Xe} \\ \text{Xenon} \end{matrix}$	
$\begin{matrix} 133 \\ 55 \\ \text{Cs} \\ \text{Caesium} \end{matrix}$	$\begin{matrix} 137 \\ 56 \\ \text{Ba} \\ \text{Barium} \end{matrix}$	$\begin{matrix} 139 \\ 57 \\ \text{La} \\ \text{Lanthanum} \end{matrix}$	$\begin{matrix} 179 \\ 72 \\ \text{Hf} \\ \text{Hafnium} \end{matrix}$	$\begin{matrix} 181 \\ 73 \\ \text{Ta} \\ \text{Tantalum} \end{matrix}$	$\begin{matrix} 184 \\ 74 \\ \text{W} \\ \text{Tungsten} \end{matrix}$	$\begin{matrix} 186 \\ 75 \\ \text{Re} \\ \text{Rhenium} \end{matrix}$	$\begin{matrix} 190 \\ 76 \\ \text{Os} \\ \text{Osmium} \end{matrix}$	$\begin{matrix} 192 \\ 77 \\ \text{Ir} \\ \text{Iridium} \end{matrix}$	$\begin{matrix} 195 \\ 78 \\ \text{Pt} \\ \text{Platinum} \end{matrix}$	$\begin{matrix} 197 \\ 79 \\ \text{Au} \\ \text{Gold} \end{matrix}$	$\begin{matrix} 201 \\ 80 \\ \text{Hg} \\ \text{Mercury} \end{matrix}$	$\begin{matrix} 204 \\ 81 \\ \text{Tl} \\ \text{Thallium} \end{matrix}$	$\begin{matrix} 207 \\ 82 \\ \text{Pb} \\ \text{Lead} \end{matrix}$	$\begin{matrix} 209 \\ 83 \\ \text{Bi} \\ \text{Bismuth} \end{matrix}$	$\begin{matrix} 210 \\ 84 \\ \text{Po} \\ \text{Polonium} \end{matrix}$	$\begin{matrix} 210 \\ 85 \\ \text{At} \\ \text{Astatine} \end{matrix}$	$\begin{matrix} 222 \\ 86 \\ \text{Rn} \\ \text{Radon} \end{matrix}$	
$\begin{matrix} 223 \\ 87 \\ \text{Fr} \\ \text{Francium} \end{matrix}$	$\begin{matrix} 226 \\ 88 \\ \text{Ra} \\ \text{Radium} \end{matrix}$	$\begin{matrix} 227 \\ 89 \\ \text{Ac} \\ \text{Actinium} \end{matrix}$																

Key:

